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FINAL REPORT

AHERN MINE PROJECT
RICHLAND COUNTY, MONTANA

JANUARY, 1986

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FINAL REPORT

AHERN MINE PROJECT
RICHLAND COUNTY, MONTANA

JANUARY, 1986

ATTENTION: Mr. Richard Juntunen, Chief
Abandoned Mine Reclamation Bureau
Department of State Lands
1625 11th Avenue
Helena, MT 59620

PREPARED BY: L. C. Hanson Company
Consulting Engineers
3108 McHugh Lane
PO Box 299
Helena, MT 59624

Thomas D. Klempel, E.I.T.
Project Engineer

William F. Shaw
Project Inspector

L. C. HANSON COMPANY
CONSULTING ENGINEERS & SURVEYORS
HELENA — GREAT FALLS — GLENDIVE

AHERN MINE PROJECT

PROJECT OBJECTIVES:

The AHERN MINE Reclamation Project was undertaken to eliminate a hazard to public safety and return the surface to a usable condition.

This hazard was created by the collapse of an abandoned coal mine.

PROJECT LOCATION:

The AHERN project site is located in Richland County, MT. It is situated in Township 23 North, Range 53 East in the northwest quarter of Section 26 and the northeast quarter of Section 27.

SITE DESCRIPTION:

The AHERN site is located in very rugged terrain, one-half mile north of a county road. Nothing remained of the original mine access road; access was gained through a field and pasture.

The site was in the midst of hilly grassland. The slopes of the surrounding hills ranged from vertical to 2:1.

The mine adit was made in the southern embankment of a drainage system and under a sandstone outcrop (see slides 2A thru 11A). A mine map was available for the AHERN MINE (map attached). It shows that much of the outcrop had been undermined and left without pillars. This may account for the heavily-collapsed appearance of the mine opening (see slides 2A thru 8A). One opening yet remained open, though much of the ceiling material had fallen (see slides 9A and 10A).

PROJECT PLANNING:

L. C. Hanson Company designed and engineered the reclamation plan for this project, which was approved by the Montana Department of State Lands. L. C. Hanson Company was also responsible for Contract administration and on-site inspection services.

Planning for this project was the result of site visits and ground photography.

PROJECT SCOPE:

The work prescribed to reclaim this mine included: salvaging and replacing the topsoil on approximately 1.5 acres; closing the mine adits by caving and backfilling; providing water to aid compaction efforts and dust control; backfilling two air shafts; re-establishing the vegetation; and reconstructing a previously existing farm fence and constructing a site perimeter fence.

WORK DESCRIPTION:

On May 24, 1985 a Notice of Award was issued to Morlock Construction, Inc. of Sidney, Montana as the successful bidder in competitive bidding.

A Notice to Proceed, dated June 12, 1985 with a Start Work date of June 19, 1985, was issued to Morlock Construction, Inc., the Contractor having met all bonding and insurance requirements.

On June 19, 1985 a Preconstruction Conference was held at the site. Conference attendees included the Contractor and representatives of the Department of State Lands and L. C. Hanson Company.

On June 20, 1985 reclamation work on the AHERN project commenced. Work began with removal of all debris that remained from mining operations. Only non-biodegradable debris was buried on site; other debris was disposed off site.

All topsoil was salvaged from within the construction limits using a dozer (see slides 12A, 15A and 16A). Two topsoil stockpiles were made. One was made along the northern perimeter, across and above the adjacent channel. The other was made along the southern perimeter, above the collapsed area.

After topsoil salvage the sandstone outcrop and soil overburden were pushed over the adit area (see slides 19A and 1B thru 20B). As the backfill material fell over the embankment, water was applied from a delivery truck equipped with hose and spray nozzle. Water was again applied to the material as it was spread in lifts along the face of the embankment and compacted (see slides 8B, 9B, 10B and 15B). This regrading

of the site established a final slope of 3:1 across the entire face of the collapsed area (see slides - compare the site appearance in 21B and 20C).

Both air shafts were backfilled using material hauled from the regrade area. Fill and compaction of the moisture conditioned soil was made using a backhoe mounted with a front loader.

Topsoil spreading, seeding, and permanent fence construction were completed on December 4, 1985.

COST AND QUANTITY SUMMARY:

The table below shows the work items, quantities and costs involved in the reclamation of the AHERN MINE.

		COST		
ITEM	QUANTITY	PER UNIT	TOTAL	PER ACRE
Mine Surface Reclamation:				
Includes: Salvage and placement of topsoil; regrading the site; and air shaft backfill.	LUMP SUM		$ 8,000.00	$ 5,333.33
Provide Water:				
Includes: acquisition, delivery and application.	87.8 MGAL	50.00	4,390.00	2,926.67
Construct Fence:				
Includes: Material and labor.			1,485.68	990.45
Seed, Fertilize, Mulch:				
Includes: Material and labor.			2,093.75	1,395.83
	TOTAL		$ 15,969.43	$ 10,646.29

ENGINEER'S COMMENTS:

This project was complicated by the regional topography and geologic conditions.

Topography

The west, north and east construction limits were controlled by existing natural formations. These features caused some difficulty in establishing a lower topsoil stockpile that would not interfere with other work items nor block natural drainage channels.

The massive collapse of the adit area made the upper work area nearly inaccessible from the lower work area. Only tracked vehicles were capable of making this transition; all other equipment had to be routed over one mile of trail to reach the upper area.

Geologic Conditions

The soil on the site was predominantly silt and sandy silt. This material was very difficult to place and compact, even when moisture conditioned.

Sandstone and shale underlayed much of the soil overburden. Portions of these outcrops had to be removed to achieve a 3:1 slope across the area. These rocks frequently broke in 20 C.F. chunks which would not be reduced further with a dozer. Some areas of the fill had to be excavated to bury this rock, since these surfaced after much of the fill in the lower area had been completed.

Lateral ditches across the slope had to be constructed because the broken faces of the outcrop remained surfaced after the completion of the regrading. These ditches were intended to reduce the runoff area. Hopefully a reduction in runoff quantities will limit the overall erosion of the regrade area topsoil, especially the topsoil covering the area of the surfaced rocks.

Other Conditions

The drought that was impacting the entire region had thoroughly desicated the soil. To achieve the required backfill compaction and assure the surface integrity of the haul roads, much more water was required than had been anticipated.

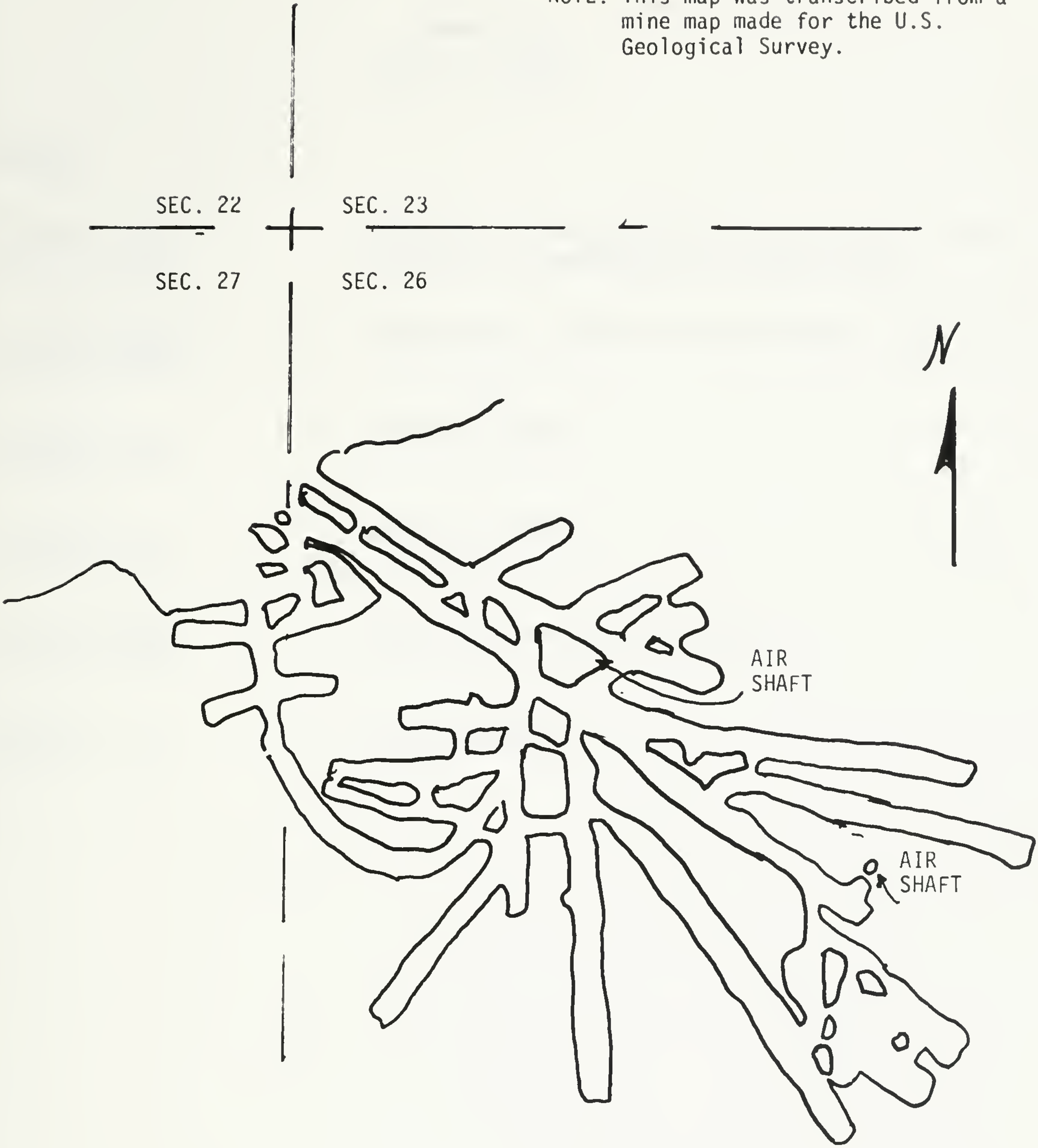
ACCOMPLISHMENTS:

This project was successfully concluded and achieved its objective of eliminating the discernible hazards to public safety. It remains unknown whether the adits were permanently sealed because the manner of the collapse made it extremely difficult to locate the actual openings.

Respectfully submitted,

William F. Shaw, C.E.T.
Project Field Inspector

NOTE: This map was transcribed from a mine map made for the U.S. Geological Survey.



AHERN MINE
NW1/4 Sec.26
NE1/4 Sec.27
T.23 N. R.53 E.

6/2/33--3/1/34
Approx. Scale: 1"=100'

- PHOTO LOG -

AHERN MINE PROJECT

SHEET A

Slides 1 thru 7 June 19, 1985	Shots made looking south traveling from east to west. Site prior to commencement of construction.
Slides 8 thru 11 June 19, 1985	Looking east. Open adit along west edge.
Slide 12 June 20, 1985	Stripping topsoil.
Slide 13 June 20, 1985	Water application.
Slide 15 and 16 June 20, 1985	Upper work area. Topsoil profile.
Slide 19 June 20, 1985	Caving embankment.

- PHOTO LOG -

AHERN MINE PROJECT

SHEET B

Slides 1 thru 4 June 21, 1985	Closing adit with D7G Dozer.
Slides 5 thru 9 June 21, 1985	Panoramic view of site after stripping and commencement of stripping.
Slide 10 June 21, 1985	Water application.
Slide 15 June 21, 1985	Water application.
Slides 16 thru 20 June 21, 1985	Caving embankment.
Slide 21 June 21, 1985	View of site.

- PHOTO LOG -

AHERN MINE PROJECT

SHEET C

Slides 1 thru 5 June 21, 1985	Panoramic view of site. Moving east to west.
Slides 6 thru 10 June 24, 1985	Panoramic view of site. Moving east to west.
Slides 11 thru 13 June 26, 1985	Patrol spreading and compacting. Berm construction.
Slides 14 thru 19 June 26, 1985	Panoramic view of site. Moving east to west.
Slide 20 June 26, 1985	Site - looking east.

- PHOTO LOG -

AHERN MINE PROJECT

Slide 1 November 15, 1985	Fence deficiency - deadman should be placed here. Fence post pulled out of ground because of no deadman. Contractor corrected on 12/4/85.
Slide 2 November 15, 1985	Fence deficiency - deadman should be placed here. Fence post pulled out of ground because of no deadman. Contracted corrected on 12/4/85.
Slide 3 November 15, 1985	Completed project - revegetation and fencing.
Slide 4 November 15, 1985	Completed project - revegetation and fencing.
Slide 5 November 15, 1985	Completed project - revegetation and fencing.
Slide 6 November 15, 1985	Landowner inspecting completed project - Johnny Willert.
Slide 7 November 15, 1985	Double panel construction.